

Academic Year: (2022 / 2023)

Review date: 20-05-2022

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: CASTRO GONZALEZ, ALVARO

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Programming (Course: 1/ Semester: 1)

C++ will be used during the lab sessions. If you are not familiar with this programming language but you are willing to learn, we will provide learning resources.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to robotics
2. Perception in robotics
3. Actuation in robotics
4. Navigation
5. Processing elements
6. Decision-making in robotics
7. Human-Robot Interaction
8. Novel applications

LEARNING ACTIVITIES AND METHODOLOGY

- Theoretical lessons and doubts solving sessions, tutorial support sessions and student personal work; this is aimed at the acquisition of theoretical knowledge.
- Practical sessions, tutorial support sessions and student personal work; this is aimed at the acquisition of practical abilities.

ASSESSMENT SYSTEM

- Continuous assessment: 100%.
 - o First midterm exam (30%, if passed the content will be removed for the final exam).
 - o Second midterm exam (30%, if passed the content will be removed for the final exam)
 - o Final practical project: 30%.
 - o Class participation: 10%.
- Final exam:
 - o 0%: if the student follows the continuous assessment, this exam will be taken only with the part(s) not passed in the midterm(s).
 - o 100%: if the student has not followed the continuous assessment, he/she will take the final exam with all the content (including content of the lab sessions) and the final mark will be worth 60% of the mark obtained.
- Extraordinary exam: 100% with all the content (including content of the lab sessions).

% end-of-term-examination:	0
% of continuous assessment (assignments, laboratory, practicals...):	100

BASIC BIBLIOGRAPHY

- Mataric, M. J. The robotics primer, The MIT Press, 2007
- Mihelj, Bajd, Ude, Lenarčič, Stanovnik, Munih, Rejc, Čalajpah, Bajd, Tadej, Ude, Alež, Lenarčič, Jadran, Stanovnik, Alež, Munih, Marko, Rejc, Jure, & Čalajpah, Sebastjan Robotics (2nd edition), Springer, 2019
- Roland Siegwart, Illah Reza Nourbakhsh and Davide Scaramuzza Introduction to autonomous mobile robots, MIT Press, 2011

- Siciliano, B., & Khatib, O. Springer Handbook of Robotics (2nd ed.), Springer, 2016

ADDITIONAL BIBLIOGRAPHY

- A. Barrientos, C. Balaguer Bernaldo de Quiroz's Fundamentos de robótica (2º ed.), McGraw-Hill Interamericana, 2007
- Craig, J. J. Robótica (3º ed.), Pearson Educación, 2006
- Kajita, Shuuji, Hirukawa, Hirohisa, Harada, Kensuke, & Yokoi, Kazuhito Introduction to Humanoid Robotics (2014th ed., Vol. 101), Springer, 2014

BASIC ELECTRONIC RESOURCES

- Cyberbotics . Documentation of Webots: <https://cyberbotics.com/doc/guide/index>
- Jason M. O'Kane . A gentle introduction to ROS: <https://cse.sc.edu/~jokane/agitr/agitr-letter.pdf>
- R. Patrick Goebel . ROS by examples v2 Índigo: http://file.ncnynl.com/ros/ros_by_example_v2_indigo.pdf
- ROS.org . Official ROS website: <https://www.ros.org>